

ELECTIVE (SSC5b) REPORT (1200 words)

A report that addresses the above four objectives should be written below. Your Elective supervisor will assess this.

Beth Israel Deaconess Medical Center (BIDMC) elective in Neurosurgery

In my pre-medical years as a neuroscience masters student I became tremendously fascinated by Parkinson's disease (PD) - it's diverse presentation of motor and non-motor symptoms, underlying aetiology, pathophysiology and management. Once in medical school I was able to attend neurology outpatient clinics specializing in PD and movement disorders, and contributed to research in subtypes of PD. However, I had very little experience and knowledge of the surgical management of PD and other neurological conditions. I was aware of literature on deep brain stimulation (DBS) and surgical intervention for neurological diseases authored by Dr Ron Alterman, the professor of neurosurgery at Harvard Medical School (HMS) and Chief of Neurosurgery at Beth Israel Deaconess Medical Centre (BIDMC). Opportunely, I commenced a two-week neurosurgical placement under his supervision in the operating rooms (OR) at BIDMC, a world-class institution in Boston, Massachusetts.

Objective 1: Describe the pattern of neurosurgical conditions in Boston, US and discuss this in the context of global health

Broadly speaking, neurosurgical conditions can be divided into cranial and spinal neurosurgery (incorporating elective and emergency trauma cases). I was mainly observing neurosurgeons with special interests in the cranial procedures, such as DBS and craniotomies. Although there were many concurrent spinal surgeries that I was able to observe, including discectomies with spinal fusion and laminectomies. US, particularly Boston, New England is very similar to the UK in that there is a large ageing population. As a result many of the neurosurgical procedures taking place were for conditions associated with age such as PD, aneurysm coiling and degenerative disc diseases, spinal stenosis, etc. Both UK and the US have a significant number of neurosurgical admissions relating to trauma such as subarachnoid haemorrhages, aneurysm ruptures or chronic pain. In fact, the Royal London and BIDMC are regarded as renowned trauma centres and so it is possible that I have observed an overrepresentation of the level of traumatic neurosurgical cases within the population.

Although my experience of neurosurgery in the UK was limited to a weeklong placement during medical school, there are noticeably more elective neurosurgical procedures taking place on a daily basis in the US than in the UK. This could be a result of numerous reasons, for example the vast difference in population sizes and also because BIDMC has a large surgical department with an OR specifically for cranial neurosurgeries (elective and emergency/ trauma cases). BIDMC also houses the Brain Aneurysm Institute for cerebrovascular conditions and due to its sheer size and the significant funding it receives it is able to offer neurosurgical services for motor disorders, epilepsy, chronic pain, spinal conditions, central nervous system tumours, hydrocephalus, chiari malformations, syringomelia and trigeminal neuralgia. Comparatively the neurosurgical services in the UK are smaller and far less neurosurgical sub-specialities are available.

Objective 2: Describe the pattern of health provision in the USA compared to health provision within the UK

Notably, the stark difference between the US and the UK medical healthcare system is that the US health care provision revolves around private medical insurance available through employers or private purchase. Healthcare services in the US will also alert patients of which medical insurance policies they will accept in advance of elective treatment. Although following the advent of the Affordable Healthcare Act in 2010, many more patients are covered by the state financed Medicare and Medicaid insurances that are for elderly (over 65) and low-income households. Additionally, in the case of emergency conditions, US hospitals are legally required to treat patients without discriminating against their ability to pay for the healthcare they receive. BIDMC also offers financial assistance for those who were denied Medicaid or for medical hardship, i.e. if the medical costs are more than 25% of the patient's total income.

In the UK, patients requiring neurosurgery will be referred from their General Practitioner (GP) to a team of neurologists and neurosurgeons who will evaluate and manage the patient through the National Health Service (NHS). Only in emergency cases will patients come directly to Accident and Emergency (A&E) and then are triaged and determined for neurosurgery. The NHS is a well-established health care system that is funded through national insurance and taxation allowing for universal free at the point of care health provision. Only in exceptional circumstances, such as to expedite the process or for services specializing in the management of rare conditions not available on the NHS, will patients use private healthcare. Comparable to the UK, patients in the US access neurosurgical services through referrals from their family doctor, the equivalent to a GP, or through a neurologist. Patients in the US also have a lot of choice in which specific physician they would like to see, and these decisions are often based on recommendations on the individual physician's reputation. This concept of a patient-driven healthcare system is vastly different to the NHS where there is a standard level of care and choice of physician depends on availability, postcode and GP referral.

Objective 3: Describe how the management and treatment of neurosurgical conditions in the US differs from the UK

By and large, the management and treatment of neurosurgical conditions is very similar, although there is more access to specialized equipment such as stereotactic radiosurgery or intensity modulated radiotherapy in the US as resources are limited in the UK and few centres offer these treatments. However the general layout, equipment and staff in the operating room are almost identical to the UK operating theatres, and procedures are often carried out in the same way. However there are some slight differences for example, I saw a great deal of neurovascular surgeries such as aneurysm coil occlusion which can be managed by neurosurgeons in the UK but are mainly conducted by interventional neuroradiologists. Furthermore, in the US there are registered nurse practitioners who have specialized in neurosurgery and are crucial to a patient's treatment and management. With a role akin to a junior doctor, they clerk and examine patients on consults and then discuss the management plan with the neurosurgeon. Their surgical role involves prepping the patient, cauterizing, suctioning and suturing; and once the surgery is complete they will organise the follow-up investigations and management plan.

Objective 4: To discover the role of a neurosurgeon and what conditions they see and treat.

I observed a wide range of routine elective and emergency surgeries including: stage 1 (insertion of electrodes; some CT guided) and stage 2 (insertion of battery-powered neurostimulator) procedures of deep brain stimulation (DBS) for PD, essential tremors and dystonia; craniotomies for aneurysm rupture, subarachnoid haemorrhage, relieving intracranial pressures following cortical infarcts (i.e. decompressive craniotomy) and aneurysm coiling; tumor resection; discectomies with spinal fusion; and laminectomies. I was provided with a great deal of teaching during each surgery and was taken through each procedure step-by-step. Through this observership I learnt what a neurosurgical career involves and the different training pathways in the UK and US. Although I am yet to decide what and where I wish to practice, neurosurgery has become an attractive career option for me.